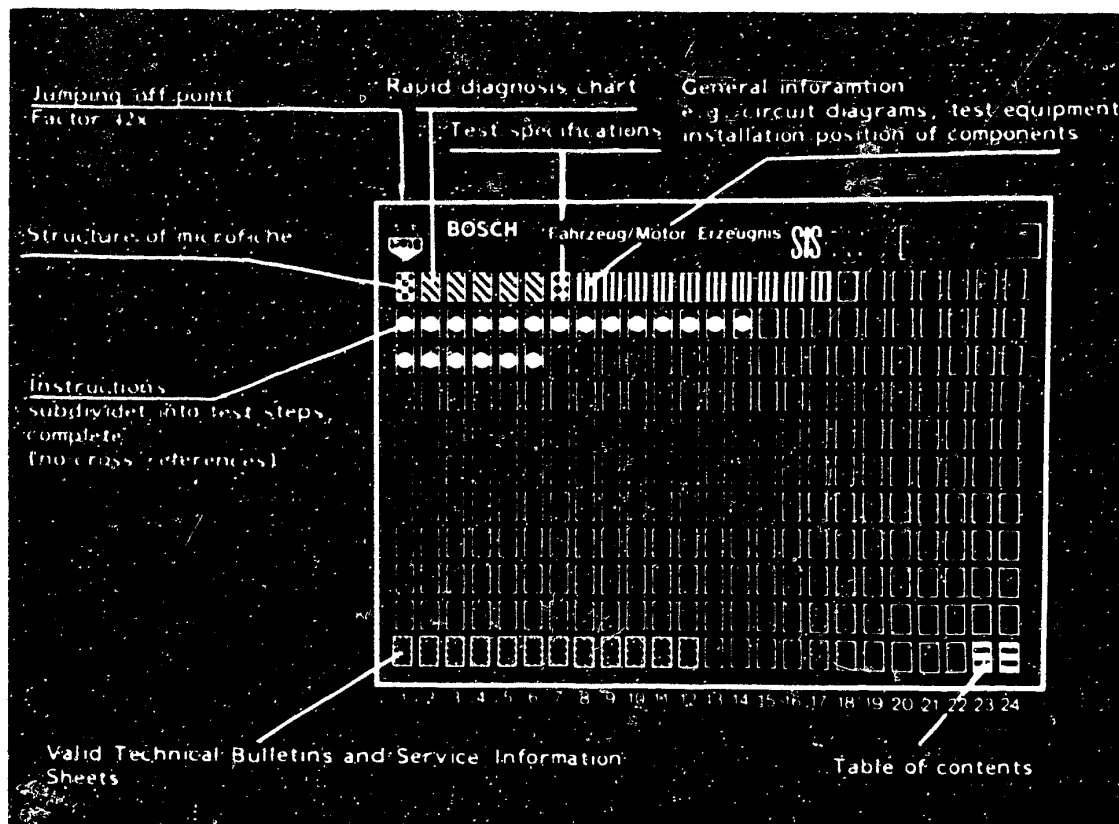


# Structure of microfiche



1. Read from left to right

2. Title of microfiche (appears on each coordinate)

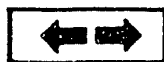
<b>E 16</b>	Product/assembly/test step	
	Vehicle/engine	

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

**C 6**

**A1**

Trouble-shooting program



## 1. Rapid diagnosis chart

The following rapid diagnosis chart makes it possible for the experienced expert to quickly check the electrical/electronic part of the ignition system using normal workshop test equipment.

The rapid diagnosis chart contains the following information:

- Customer complaint
- Cause of the trouble
- Test instructions (if no coordinate given on the right, further possibilities for testing are indicated).
- Coordinates for detailed trouble-shooting.

If detailed information and instructions on trouble-shooting are necessary, always proceed according to the trouble-shooting program starting on coordinate B 1.



Rapid diagnosis chart

Customer complaint (symptom of trouble)

- 1. Starting motor operates, but engine fails to start
- 2. Rough idling
- 3. Poor throttle response
- 4. Engine lacks power
- 5. Misfiring
- 6. Fuel consumption too high
- 7. Engine pings when accelerating
- 8. Backfiring
- 9. Engine becomes too hot

									<u>Cause of trouble</u>	<u>Test instructions</u>	<u>Coordinates</u>
●	●	●	●	●	●		●		Spark plugs defective	Assess using ignition oscillograms or remove spark plug and make visual examination.	-
●	●	●	●	●	●	●	●	●	Ignition timing incorrect	See Autodata test specifications	-
●	●	●	●	●					Shunt on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram or make visual examination.	-
●	●	●	●	●					Open circuit on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram, or test for continuity using ohm-meter	-
●									Open circuit on primary side	Test voltage supply to trigger box or test primary circuit	C 3
●	●	●	●	●					Ignition coil defective	Make visual examination, electrical test	B 5

# Rapid diagnosis chart

Customer complaint (symptom of trouble)

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring

9. Engine becomes too hot

Cause of trouble

Test instructions

Coordinates

		●	●	●	●			Interference-suppression resistors defective	Assess using ignition oscilloscope or perform resistance measurement	-
	●	●	●		●	●	●	Centrifugal advance defective	See Autodata test specifications	-
		●	●		●	●	●	Vacuum advance defective	See Autodata test specifications	-
●								Trigger box defective	Test peak-coil-current cut-off, primary voltage.	B 11/B13
●								Ignition distributor pulse generator defective	Test resistance and short-circuit to ground of coil section. Check pulse generator for mechanical damage.	C 1
●	●	●	●	●				Engine-speed limiter defective	Test cut-out speed, or perform visual examination.	-
●								Firing sequence incorrect	See Autodata test specifications	-

**A5**

Rapid diagnosis chart

Mercedes-Benz



**A6**

Rapid diagnosis chart

Mercedes-Benz



## 2. Test specifications

Ignition coil primary	0.3...0.6 $\Omega$
Ignition coil secondary	6.4...10.5 k $\Omega$

**B5**

Voltage supply ignition coil with engine idling	$\geq 10$ V
---	-------------

**B9**

Peak-coil-current cut-off approx.	5 V
approx. 1 sec. after	0 V

**B11**

Primary voltage with engine idling	220...255 V
---------------------------------------	-------------

**B13**

Resistance of coil section	485...850 $\Omega$
----------------------------	--------------------

**C1**

Short-circuit to ground of coil section	$R = \infty$
--	--------------

For adjustment values for ignition, idle speed, exhaust gas, valve clearance etc, refer to Autodata test specifications.

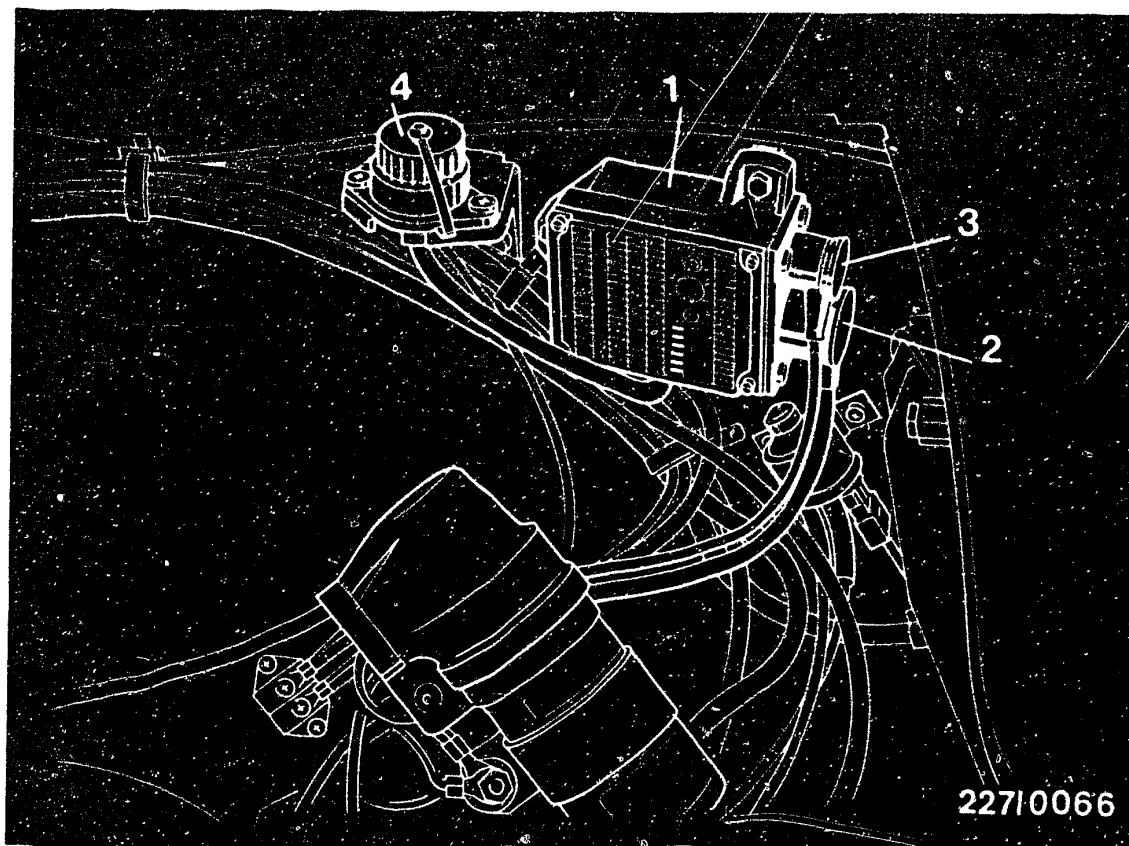
**A7**

Test specifications

Mercedes-Benz







- 1 = Trigger box
- 2 = Trigger-box plug
- 3 = Trigger-box plug - vane switch lead
- 4 = Diagnostic plug

#### 4. Location of components

The trigger box is on the left-hand wheel house in the engine-compartment and differs from that shown in the illustration according to the particular type of vehicle.

## 5. Necessary test equipment, aids

Motortester e.g.	MOT 201	0 684 000 201
Spark gap e.g. Ignition coil and condenser tester or	EFAW 106 A	0 681 100 001
Single spark gap	EF 1177/7	1 684 531 000
5 k $\Omega$ sleeve-type suppressor		0 356 500 001
Ohmmeter or e.g.	ETE 014.00 Pontavi Wh2	0 684 101 400 Commercially available
Voltmeter e.g.	ETE 014.00	0 684 101 400
Test prods		Comimercially available





## 6. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts or terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

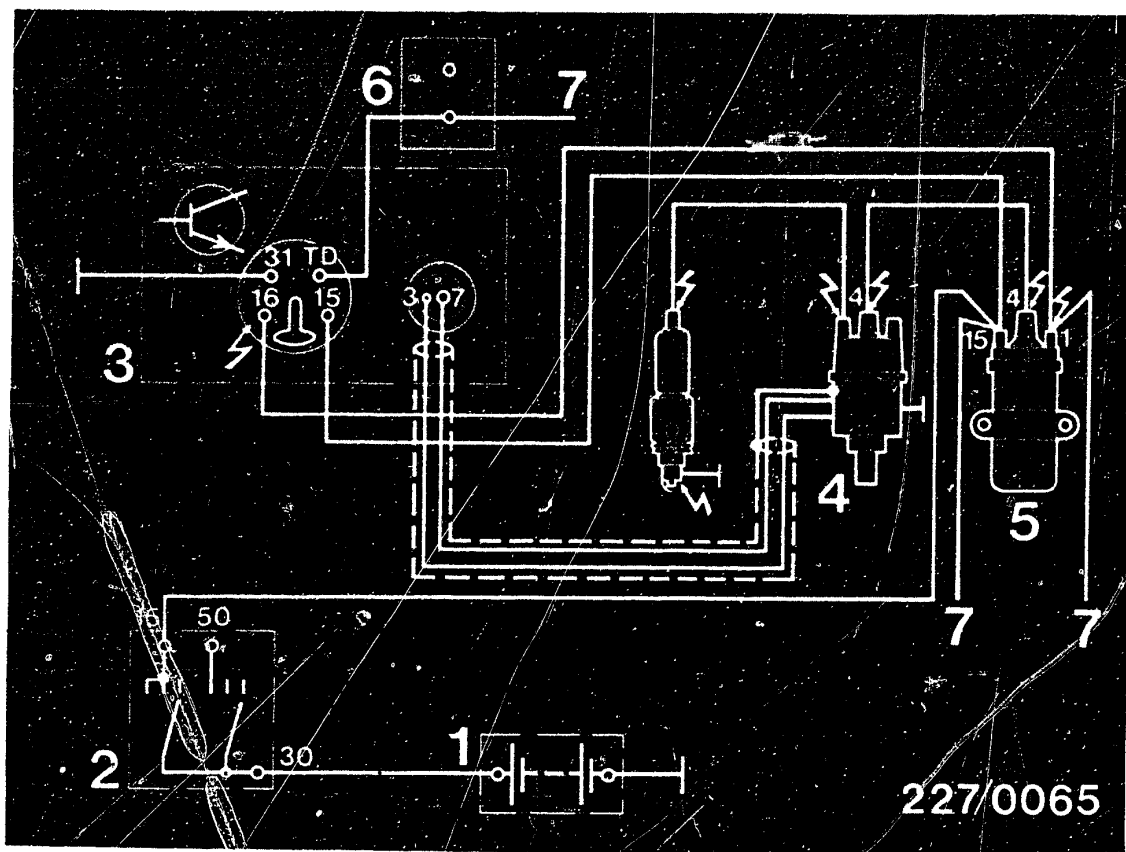
- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope, etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, ignition distributor, H.T. ignition cable, etc.).



If, while testing the ignition system or during adjustment work on the engine (e.g. carburettor), it becomes necessary to switch on the ignition (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual assemblies of the ignition system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and test equipment.





- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = Multiple butt connector
- 7 = To diagnostic plug

⚡ = Dangerous voltages (400 V - 25 KV)

### Electrical terminal diagram

The dangerous locations are marked with danger arrows taking the example of the terminal diagram of an electronic ignition system.



7. Incorrect indication of engine speed, dwell angle  
and ignition point

In ignition systems with trigger boxes 0 227 100 042 (TCI-i) with current limitation there may be an incorrect indication of engine speed, dwell angle and ignition point on testers.

For further details see Coordinates L7 - L11.



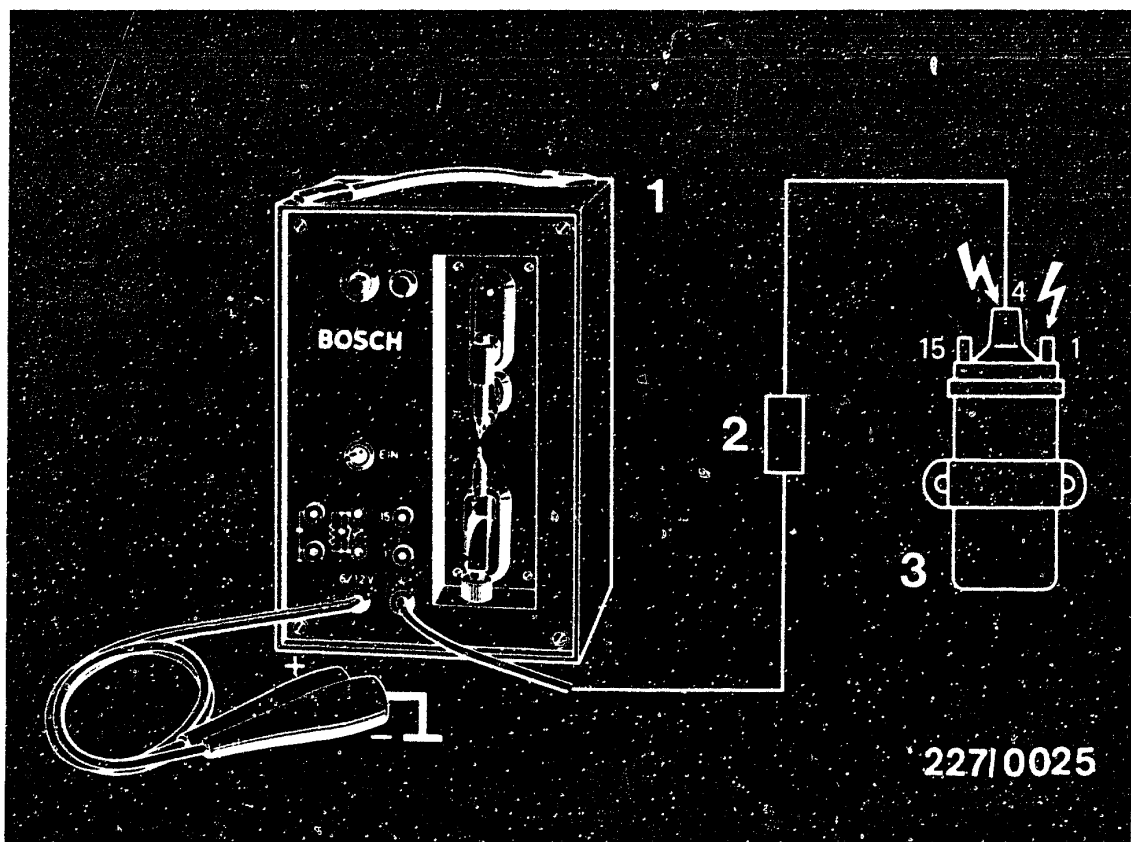
## 8. Important vehicle information

- During the compression test, either pull off the trigger-box plug or firmly connect terminal 4 of the ignition coil to ground using an extra cable (dangerous voltages, insulation damage at ignition coil, ignition distributor or ignition harness).


Note: The extra cable must be suppressed with at least  $2\text{ k}\Omega$ , e.g. with the interference-suppression sleeve ( $5\text{ k}\Omega$ ) 0 356 500 001.

- Resistance measurements must only be performed with the ignition switched off or with the battery disconnected (measuring instrument defective).
- In order to prevent the trigger box from being irreparably damaged, the secondary side of the ignition system must have at least  $2\text{ k}\Omega$  interference suppression whereby the original distributor rotor with  $1\text{ k}\Omega$  interference-suppression resistor must be fitted (even in the case of radio and spark interference suppression do not use a  $5\text{ k}\Omega$  distributor rotor).





- 1 = Spark gap
- 2 = 5 k $\Omega$  sleeve-type suppressor
- 3 = Ignition coil

 = Dangerous voltages (400 V - 25 kV)

- In order to prevent the trigger box from being irreparably damaged, when using a spark gap, an interference-suppression resistor of at least 2 k $\Omega$  must be connected between the spark gap and ignition coil terminal 4, e.g. sleeve-type suppressor (5 k $\Omega$ ) 0 356 500 001.
- In the case of ignition distributors with engine-speed limitation the ignition distributor side terminal 4 must have 1 k $\Omega$  interference suppression. Operation without interference suppression will lead to the destruction of the trigger box.



- Do not disconnect the battery while the engine is running.
- Incorrect battery polarity will lead to the destruction of the trigger box and ignition coil.
- Do not use a starting aid with more than 16 V or a fast charger for starting.
- The specified ignition coil (see Part No.) must not be replaced with a different ignition coil.
- No suppression capacitor must be connected to ignition coil terminal 1.
- Ignition coil terminal 1 must not be brought into contact with ground as a theft-proofing measure (ignition coil will be destroyed when ignition is switched on).
- No battery + or test lamp must be connected to ignition coil terminal 1 (trigger box will be destroyed).
- Ignition cable from ignition coil terminal 4 to ignition distributor terminal 4 must not be disconnected during operation.
- The line between the inductive-type pick-up and the trigger box must be screened (otherwise negative effect on the trigger-box function).



## 9. Trouble-shooting program

### Procedure

The trouble-shooting program is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The center row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and the explanation of the items in the picture.

If the questions asked in the left-hand row can be answered conclusively with "Yes", then proceed to the next test down.

If the answer to the question is "No", branch to the center row and carry out the tests given there.

Before testing, make sure of the following:

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc.). Ambient temperature/ignition system temperature 0° to +100°C (temperature has a considerable influence on measured values).





## Beginning of trouble-shooting program

Starting motor operates, engine fails to start or misfires or lacks power.

Yes

Continued on B 3 /4

**B2**

Trouble-shooting program

Mercedes Benz



Yes

Test primary voltage or, if no oscilloscope available, check whether ignition spark across spark gap.

Primary voltage testing with oscilloscope.

Connect oscilloscope to ignition coil as per operating instructions.

Start engine.

Oscilloscope must indicate a primary voltage (of any value).

Ignition spark testing with spark gap.

Remove H.T. ignition cable terminal 4 from ignition coil.

Connect spark gap including sleeve-type suppressor (5 k $\Omega$ ) to ignition coil. Adjust spark gap to 5 mm.

Start engine.

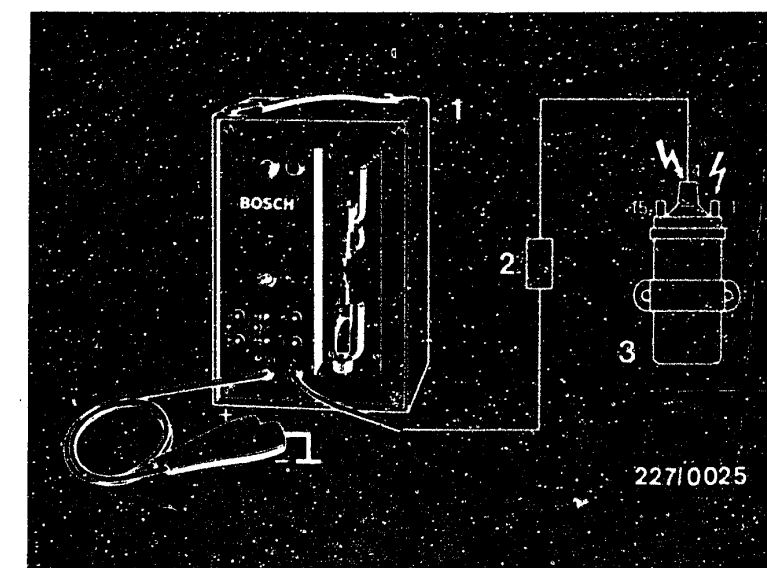
There must be sparks across the spark gap.

Primary voltage on oscilloscope or ignition sparks across spark gap?

No

If no primary voltage or no ignition spark, continue testing at C 1.

Tests from B 5 onwards not necessary.



1 = Spark gap

2 = 5 k $\Omega$  sleeve-type suppressor

3 = Ignition coil

⚡ = Dangerous voltages (400 V-25 kV)

Yes

Continued on B 5/6

**B3**

Trouble-shooting program

Mercedes-Benz

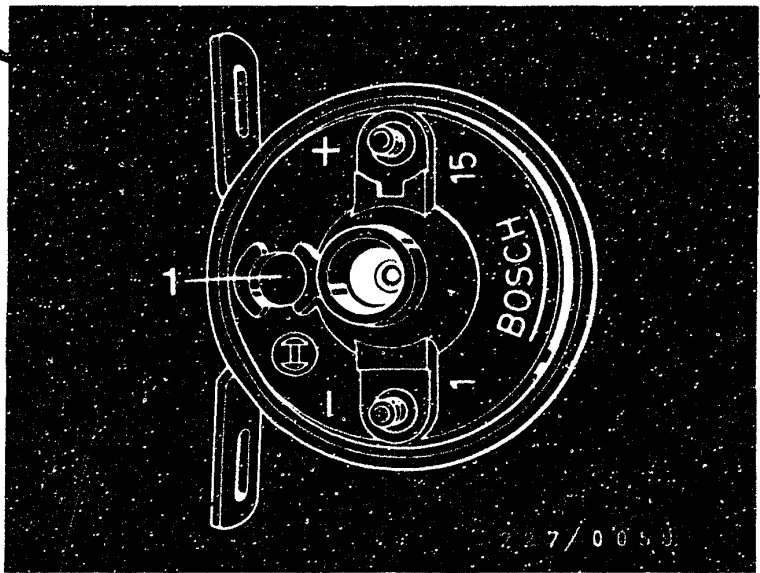
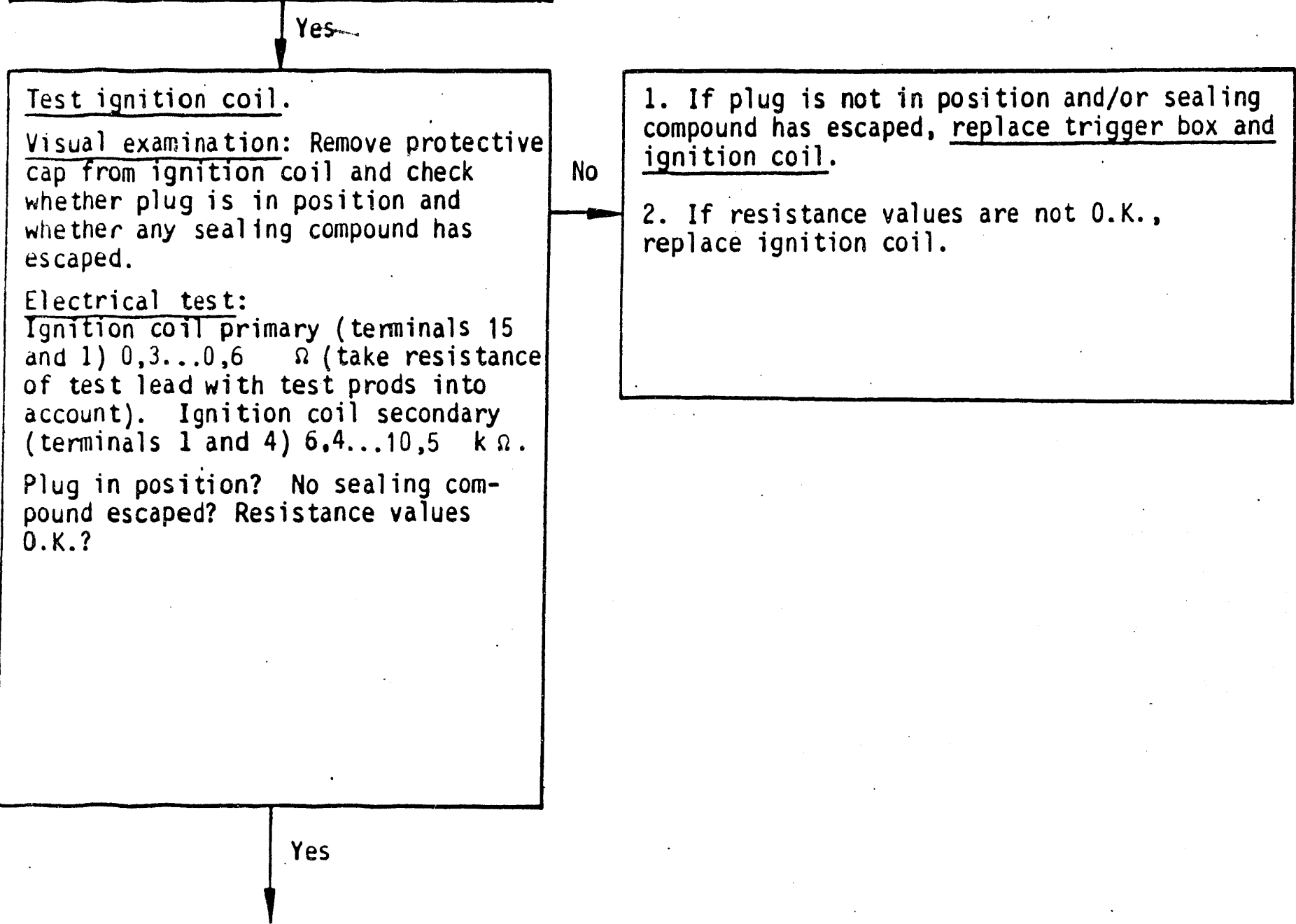
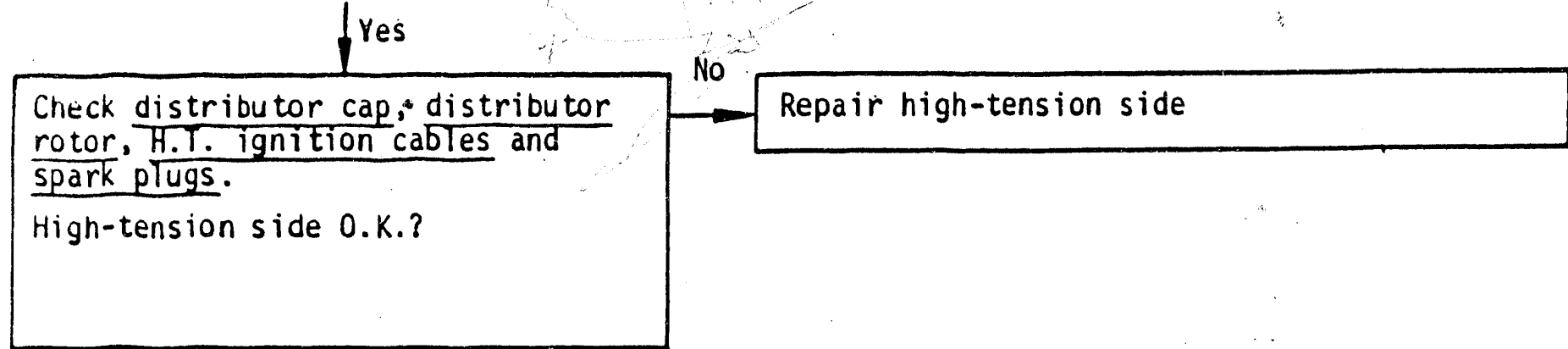


**B4**

Trouble-shooting program

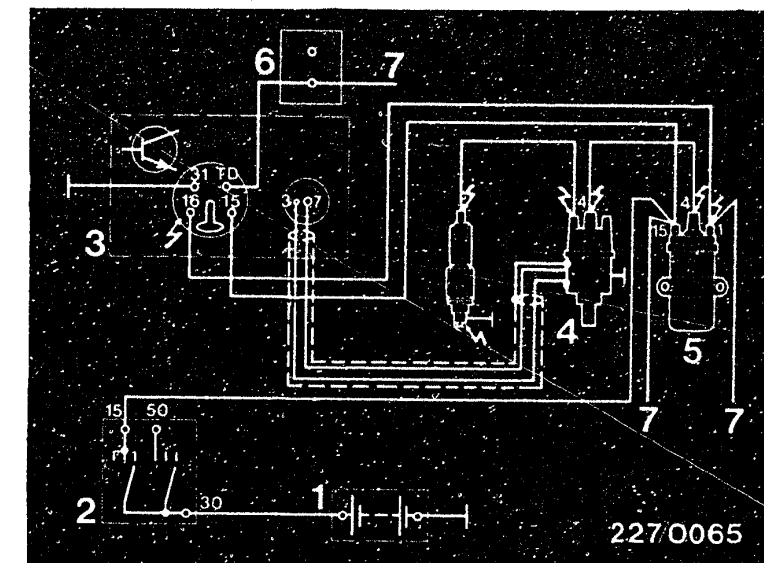
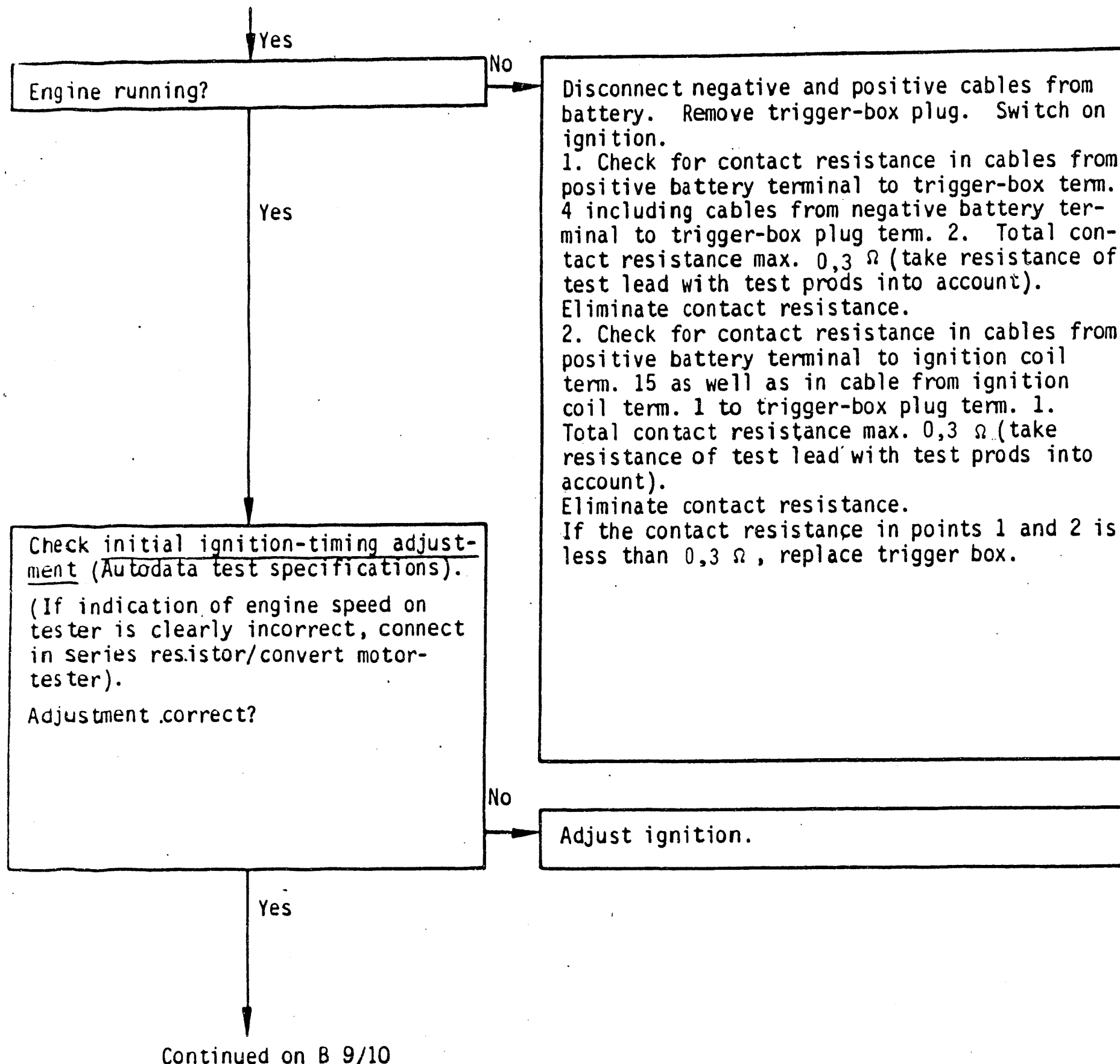
Mercedes-Benz



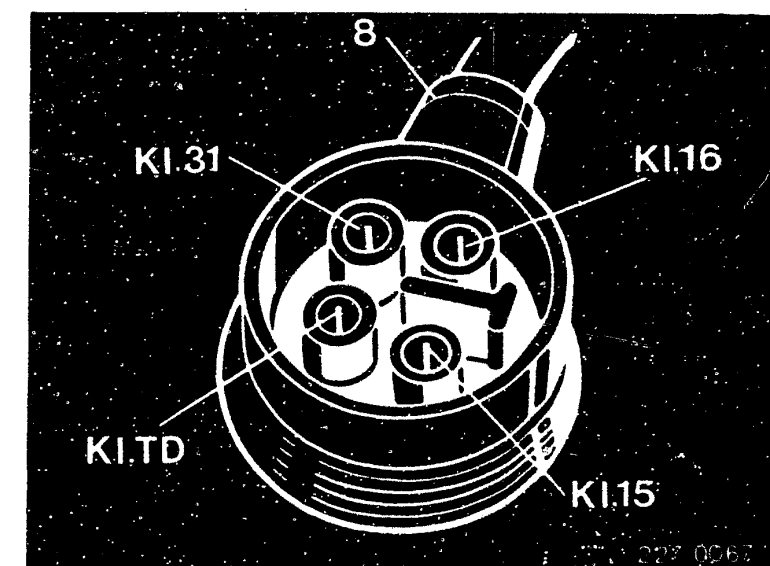


1 = Plug

Continued on B 7/8



- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- $\text{⚡}$  = Dangerous voltages (400 V - 25 kV)
- 6 = Multiple butt connector
- 7 = To diagnostic plug
- 8 = Trigger-box plug



B7

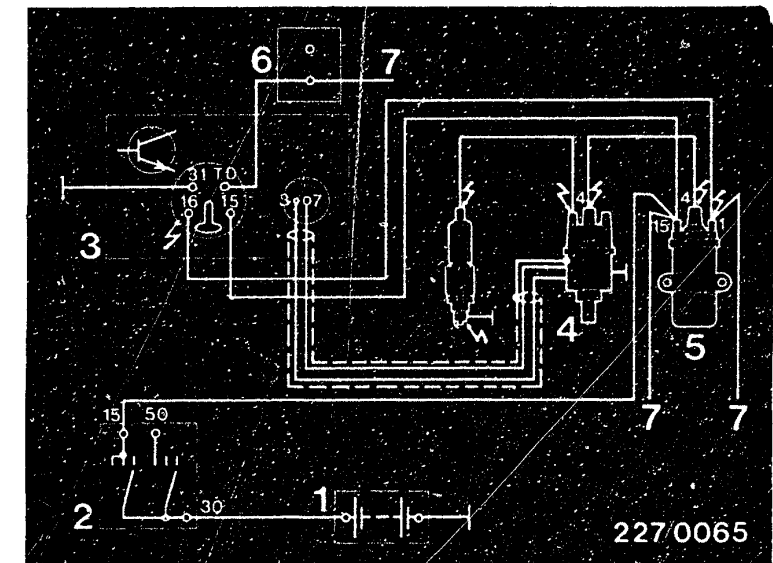
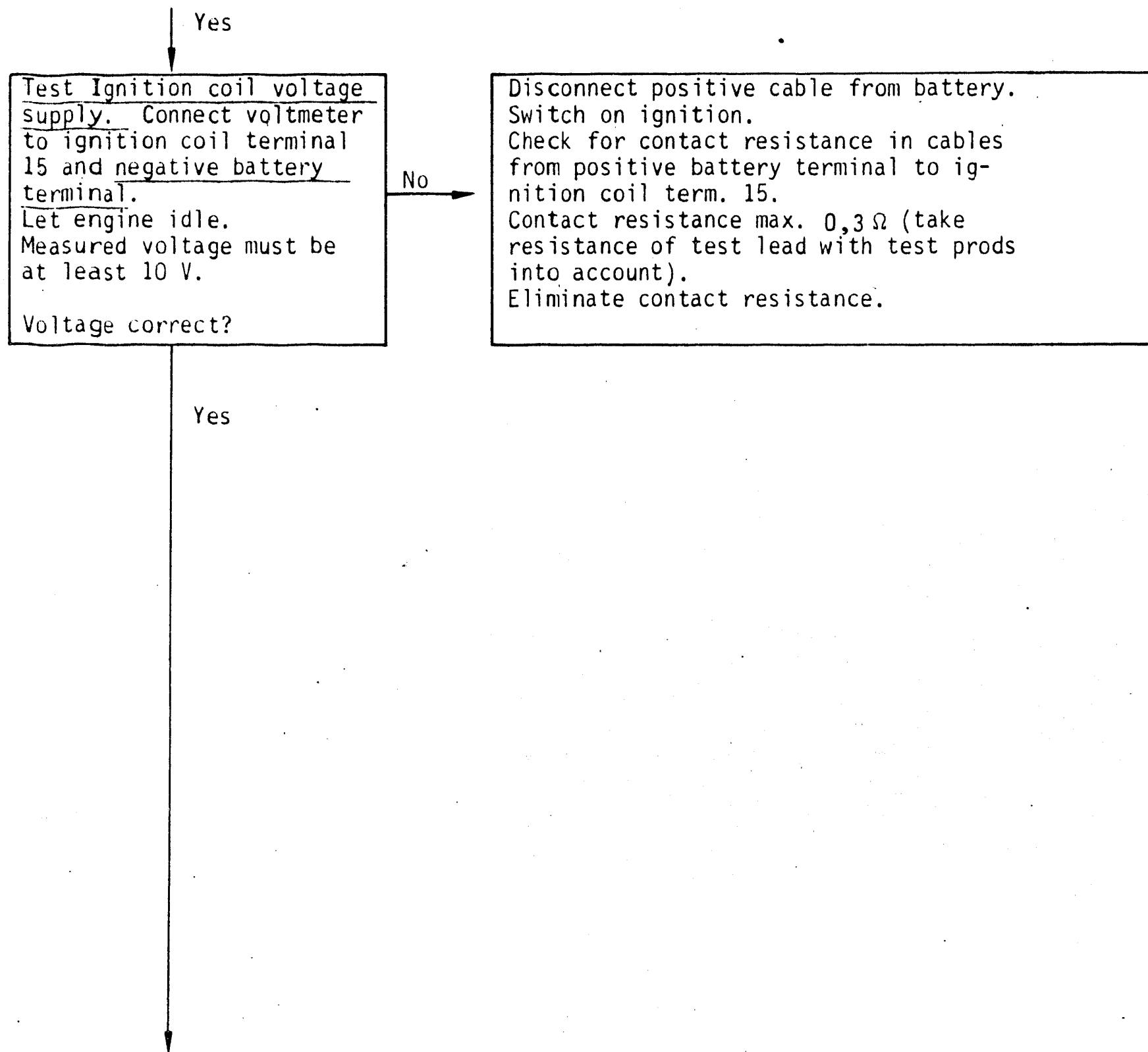
Trouble-shooting program  
Mercedes Benz



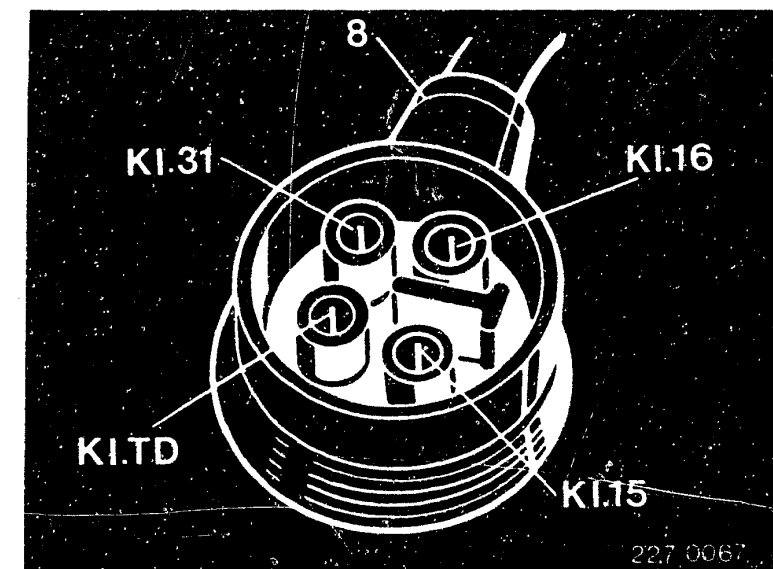
B8

Trouble-shooting program  
Mercedes Benz





- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = Multiple butt connector
- 7 = To diagnostic plug
- ⚡ = Dangerous voltages (400 V - 25 kV)
- 8 = Trigger-box plug



Continued on B 11/12

**B9**

Trouble-shooting program  
Mercedes Benz



**B10**

Trouble-shooting program  
Mercedes Benz



Yes

Check the peak-coil current cutoff.

Connect voltmeter to ignition coil terminals 15 and 1. The voltmeter should show a short deflection for approx. 1 s (approx. 5 V). Voltmeter must return to 0 V.

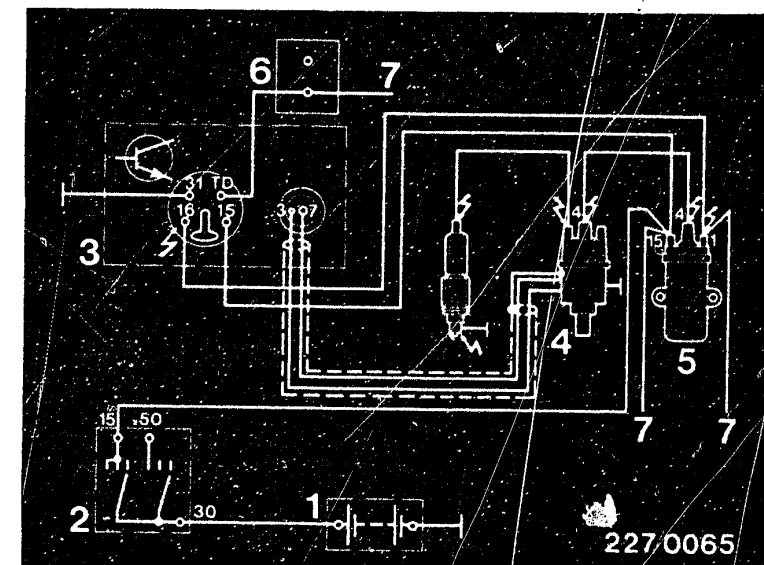
Voltage (0 V) OK?

No

Replace trigger box and ignition coil.

Yes

Continued on B 13/14



- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = Multiple butt connector
- 7 = To diagnostic plug

⚡ = Dangerous voltages  
(400 V - 15 kV)

**B 11**

Trouble-shooting program  
Mercedes Benz



**B 12**

Trouble-shooting program  
Mercedes Benz



yes

Check the primary voltage  
(if MOT series available).  
Connect the oscilloscope e.g.  
MOT 201 to ignition coil in  
accordance with the operating  
instructions.  
Run the engine at idle.  
The measured primary voltage  
must be 220...255 V. See  
Fig.  
Voltage OK?

No

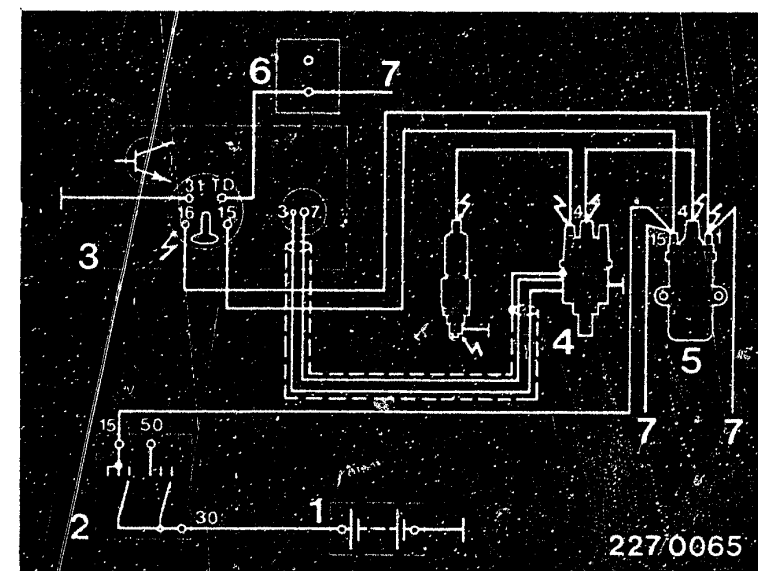
Replace trigger box.

yes

Ignition system OK.  
Tests completed.  
There is no need to proceed  
beyond C 1.

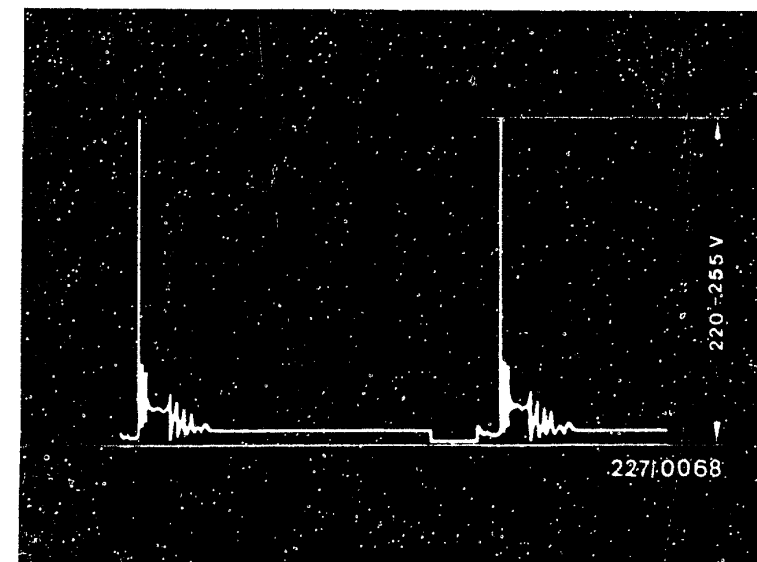
Note:

If customer complaint is still  
not remedied, then look for  
further possible faults in the  
fuel system. It is also  
possible that there is a mechan-  
ical fault in the engine.



- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = Multiple butt connector
- 7 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)



**B 13**

Trouble-shooting program  
Mercedes-Benz



**B 14**

Trouble-shooting program  
Mercedes-Benz



No primary voltage or no ignition spark.  
(Continued from B3)

yes

Test resistance of coil section including electric cable.  
Disconnect trigger box plug.  
Connect ohmmeter to the disconnected trigger box plug between terminal 1 and 2.  
Ohmmeter must show 485...850  $\Omega$ .  
Resistance value O.K.?

no

Replace coil section/ignition distributor or electric cable.

yes

Test ground connection of coil element and electric cable.  
Connect ohmmeter to disconnected trigger box plug at terminal 1 or 2 and ground connection. Ohmmeter must show ( $\infty$ ) continuously.  
Resistance value ( $\infty$ ) O.K.?

no

Replace coil section/ignition distributor or electric cable.

yes

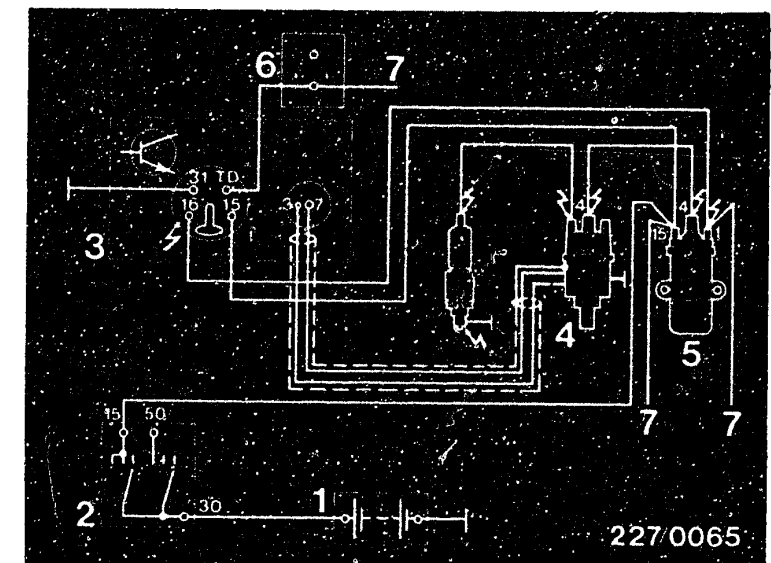
Test pickup assembly to see if there is mechanical damage.  
Visual test: timer core must not rub against the teeth of the pickup assembly. Pickup assembly O.K.?

no

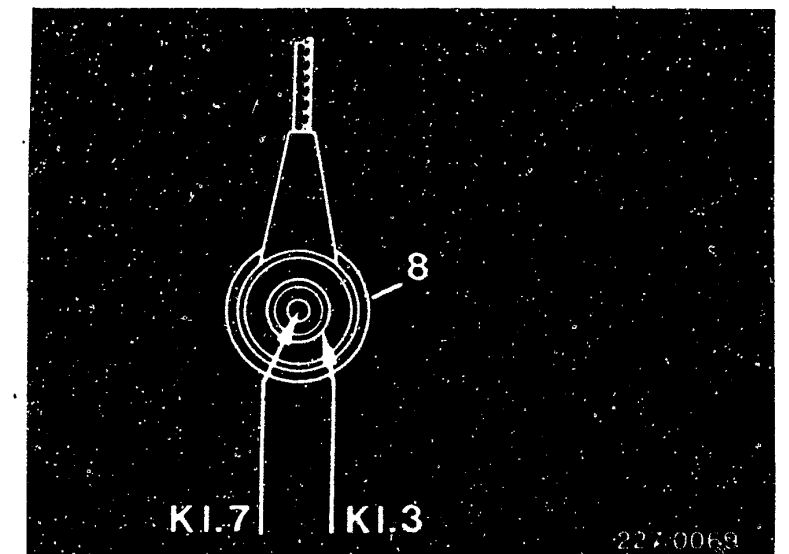
Replace pickup assembly/ignition distributor.

yes

Continued on C3/4



- 1 = battery
- 2 = ignition and starting switch
- 3 = trigger box
- 4 = resistance cable
- 5 = ignition distributor
- 6 = ignition coil
- 7 = to starting motor term. 15a
- 8 = to tachometer
- ⚡ = dangerous voltages (400 V - 25 kV)
- 9 = trigger box plug



C1

Trouble-shooting program  
Mercedes Benz

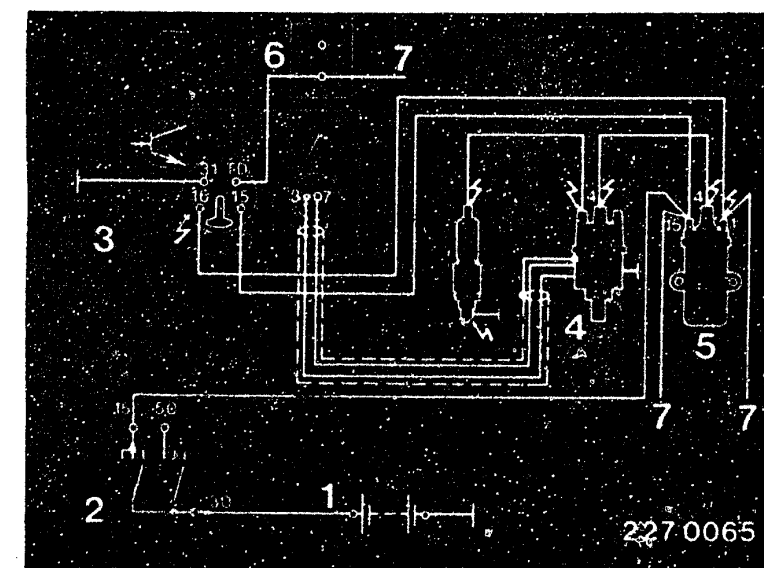
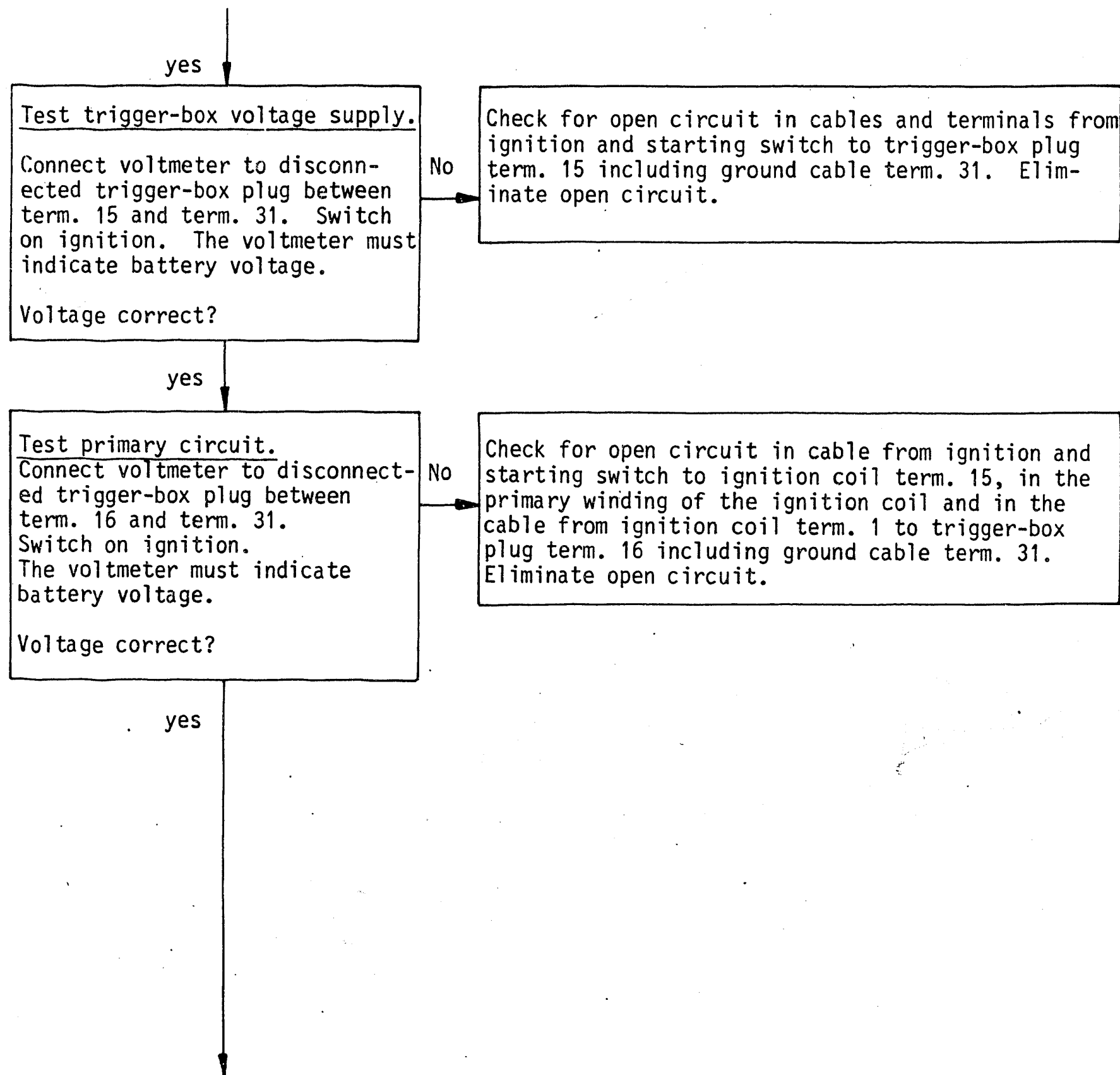


C2

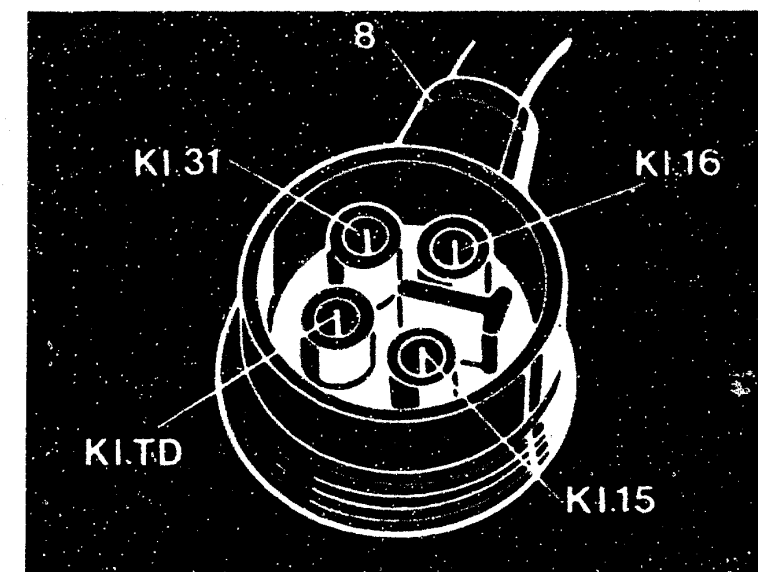
Trouble-shooting program  
Mercedes Benz







- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = Multiple butt connector
- 7 = To diagnostic socket
- ⚡ = Dangerous voltages (400 - 25 kV)
- 8 = Trigger-box plug



Yes

### Test ignition coil.

Visual examination: Remove protective cap from ignition coil and check whether plug (see illustration) is in position and whether any sealing compound has escaped.

Electrical test: Ignition coil primary (term. 15 and 1)  $0,3...0,6 \Omega$  (take resistance of test lead with test prods into account).  
Ignition coil secondary (term. 1 and 4)  $6,4...10,5 k \Omega$ .

Plug in position? No sealing compound escaped?

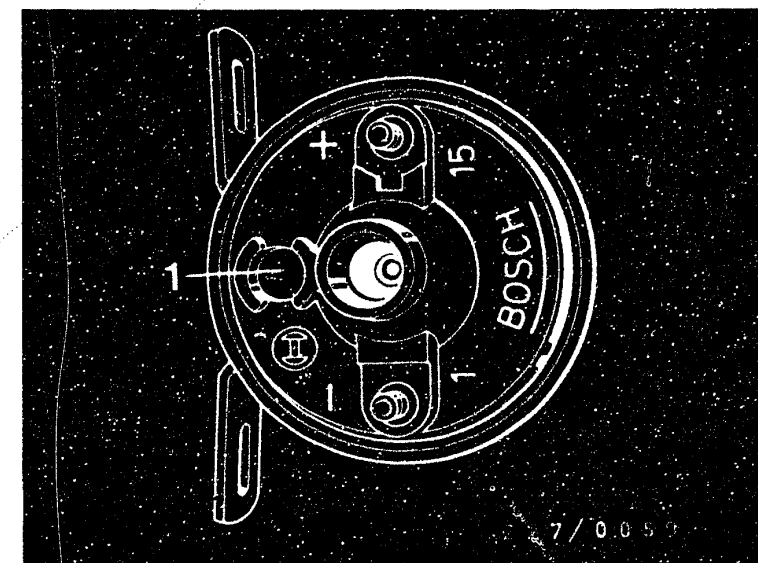
Resistance values O.K.?

No

1. If plug is not in position and/or sealing compound has escaped, replace trigger box and ignition coil.

2. If resistance values are not O.K., replace ignition coil.

1 = Plug



Yes

Replace trigger box.

Test completed.

Tests from B 5 not necessary.

#### Note:

If customer complaint is still not remedied, then look for further possible faults in the fuel system, or the engine is not mechanically O.K.

**C5**

Trouble-shooting program

Mercedes Benz



**C6**

Trouble-shooting program

Mercedes Benz



# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party

22

Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" parts or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

**BOSCH**

Geschäftsbereich KH, Kundendienst, Kfz-Ausrüstung.  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany.  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH.

**L1**

Technical Bulletin

Mercedes-Benz

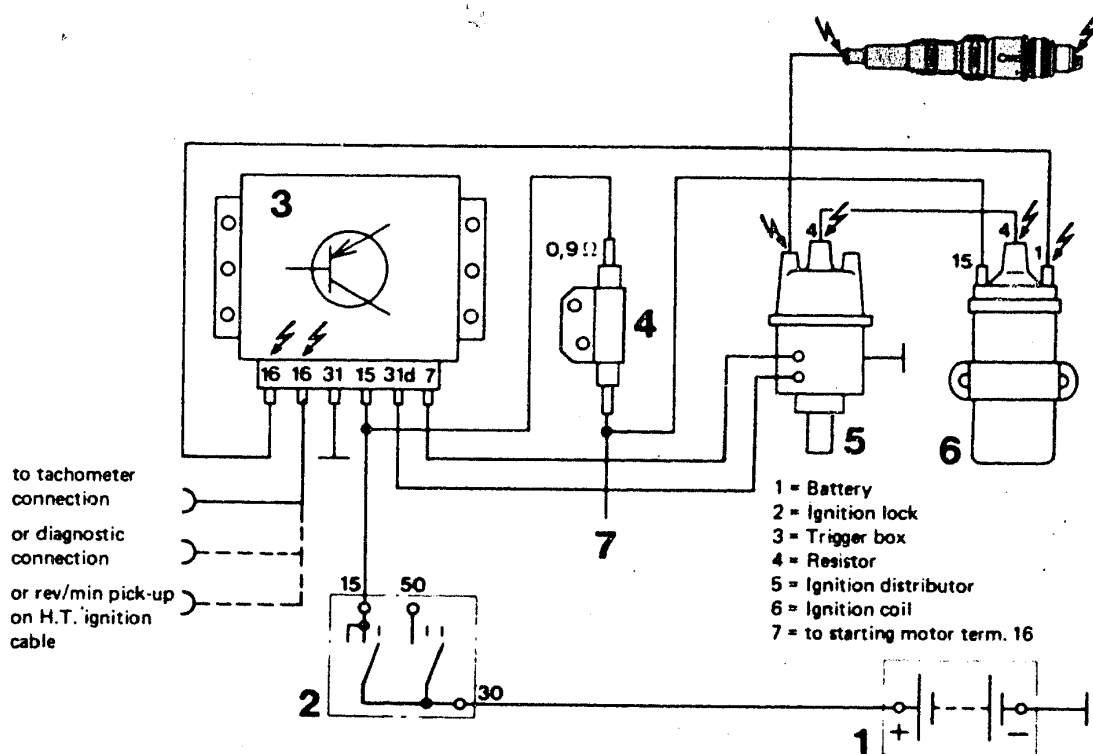


In addition, in the case of the capacitor-discharge ignition system (CDI), danger of accident is also present under the following circumstances:

- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the danger points are marked with red high-voltage arrows. We would point out that all semi-conductor ignition systems, even the older ones, are to be regarded as dangerous in the sense as defined by this bulletin.

Please address any queries or comments concerning the contents of this publication to our representative in your country.



Terminal diagram

# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

EFFECTS OF ELECTRICAL AND ELECTRONIC  
SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En

1.1981

e.g. ignition systems, Jetronic, Motronic, ABS

Please ensure without fail that this Bulletin is passed on to your employees for their attention!

We have often been asked by some of our customers whether or not patients with heart pacemakers are endangered in any way by ignition systems. This theme was recently the subject of an examination carried out by the Ignition System Development Department of Robert Bosch GmbH in conjunction with Dr. Thull, lecturer at the Central Institute for Biomedical Technology at the University of Erlangen-Nürnberg and Biotronic GmbH & Co. of Berlin, a manufacturer of heart pacemakers. The magazine "Biomedizinischen Technik" (5/80) listed the results.

The most important discoveries in this practice can be summarized from the examination report as follows:-

1. Heart pacemakers corresponding to the latest state of the art are not affected by radiation (electromagnetic fields) from ignition systems.
2. With a stationary engine and the ignition switched off the heart pacemaker is not affected by any part of the ignition system, even when unintentionally touched. Maintenance work in the engine compartment, for example, can then be carried out without any danger.
3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency).  
Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.
4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers please carry out the necessary measures.

**BOSCH**

Geschäftsbereich KH Kunden-Senet, Kfz-Ansorgung.  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany.  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH.

**L3**

Technical Bulletin

Mercedes-Benz



We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.



# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

### NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

1.1983

The introduction of new ignition systems has made it necessary to reclassify all designations.

The designations listed below will be used immediately in KH workshop and sales literature.

Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	Mechanical (breaker points)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized coil ignition	TSZ-K (TCI-c)	K=breaker-triggered	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Trigger box with conventional circuit techniques	TSZ-I* (TCI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
	TSZ-H	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized ignition	TZ-I* (TI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
(Trigger box in Hybrid technique)	TZ-H* (TI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)

**BOSCH**

Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung.  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany.  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH.

**L5**

Technical Bulletin

Mercedes-Benz



Designation	Abbreviated code	Meaning	Switching part	Ignition control and spark advance	High-voltage distribution
Electronic ignition	EZ-L	L=characteristic curve	electronic (trigger box or control unit)	electronic (control unit)	mechanical (ignition distributor)
	EZ-F	F=ignition map	electronic (trigger box or control unit)	electronic (control unit)	mechanical (high-voltage distributor)
Distributorless semiconductor ignition	VZ-L	L=characteristic curve	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)
	VZ-F	F=ignition map	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)

\* Please note: The ignition system can additionally be fitted with a DLS unit (digital idle stabilizer) or with an ELS unit (electronic idle stabilizer) or with an ESV unit (electronic ignition retardation).





# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party

INCORRECT DISPLAY OF ROTATIONAL SPEED AND  
DWELL ANGLE ONLY WITH TRIGGER BOXES  
0 227 100 ... (TCI-i, TCI-h) WITH CURRENT  
LIMITATION

VDT-I-Gen. 030 En  
6.80  
Supersedes Ed. 3.80

For additional information see VDT-I-Gen. 032 En

### 1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT 001.00}	Rotational-speed	KTE 001.00
001.01}	display O.K. with these	001.02
001.02	testers	001.03
001.04		
002.00		

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild-ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan-Datsun	(Hitachi ignition system)
Fiat	(Delco ignition system)	Peugeot	(Bosch ignition system)
Ford	(Delco ignition system)	VW	(Bosch/Fairchild ignition system)
General-Motors	(HEI-ignition system)	Bosch transistorized ignition system for retrofitting 0 227 100 920	

**BOSCH**

Geschäftsbereich KM Kundendienst Kfz-Ausrüstung  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

**L7**

Motor Vehicle Service Information

Mercedes-Benz



#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party

### MOTORTESTER CONVERSION

Incorrect display of rotational speed,  
dwell angle and ignition point  
only with trigger boxes  
0 227 100 ... (TCI-i, TCI-h) with current  
limitation

VDT-I-Gen. 032 En  
6.80

For additional information see VDT-I-Gen. 030 of 6.80

Re.: Motortester EFAW 268  
268 S 10  
269  
214 B  
AE 2000

#### 1. General

Please make sure that the above-mentioned motortesters in your workshop and at your customers (e.g. motor vehicle workshops, oil companies, gas stations, vocational schools etc.) are converted. The conversion is subject to payment and is carried out by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with fitting of switch).

#### 2. Why motortester conversion?

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle as well as to incorrect triggering of the meter when testing the ignition system. There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing light is triggered by the signal path dwell angle - meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

#### 3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing light is triggered by the clamp-on induction pickup and the pulse shaper stage.

**BOSCH**

Geschäftsbereich KH Kundendienst Kfz-Ausstattung  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

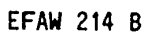
**L9**

Motor Vehicle Service Information

Mercedes-Benz



b = (Extract from  
WJF 508/1  
Page 53)



(Extract from  
WJF 503/1, Page 64)

By fitting the switch with change-over contact in the front panel of the motor-tester, it is possible to switch over from standard ignition systems to those with current limitation. We recommend that the switch positions be marked correspondingly: e.g. "standard" - "current limitation". These conversion measures have already been published in the K7 information sheet KdF 25/7911.

#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

TESTS ON ELECTRONIC IGNITION SYSTEMS  
(TCI, TZ)  
TESTER INSTRUCTIONS

VDT-I-Gen. 035 En  
3.1981

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscillograph:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- Calculating the "ignition voltage reserve" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

**BOSCH**

Geschäftsbereich KH Kundendienst Kfz-Ausrüstung  
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany.  
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

**L12**

Motor Vehicle Service Information

Mercedes-Benz



## Table of Contents

<u>Section</u>	<u>Coordinates</u>
Structure of microfiche.....	A 1
1. Rapid diagnosis chart.....	A 2
2. Test specifications.....	A 7
3. Electrical terminal diagram.....	A 8
4. Installation position of components.....	A 9
5. Necessary test equipment, aids.....	A10
6. Danger of accident on electronic ignition systems.....	A11
7. Incorrect indication of engine speed, dwell angle and ignition point.....	A14
8. Important vehicle information.....	A15
9. Trouble-shooting program.....	B 1
Test if primary voltage/ignition spark present.....	B 3
Test if primary voltage/ignition spark <u>not</u> present.....	C 1



SectionCoordinates

Technical Bulletin  
(Danger of accident)

L 1

Technical Bulletin  
(Effects of electrical and  
electronic systems on  
heart pacemakers)

L 3

Technical Bulletin  
(New designations for  
ignition systems)

L 5

Motor Vehicle Service Information  
(Incorrect display of Rotational  
Speed and Dwell Angle)

L 7

Motor Vehicle Service Information  
(Motortester conversion)

L 9

Motor Vehicle Service Information  
(Tests on electronic ignition  
systems)

L 12

© 1983 Robert Bosch GmbH  
Automotive Equipment - After-Sales Service,  
Department for Technical Publications KH/VDT,  
Postfach 50, D-7000 Stuttgart 1

Published by: After-Sales Service, Department for  
Training and Technology (KH)VSK). Press date: 2.1983

Please direct questions and comments concerning the  
contents to our authorized representative in your  
country.

This publication is only for the use of the Bosch  
After-Sales Service Organization, and may not be passed  
on to third parties without our consent.

Microfilmed in the Federal Republic of Germany.  
Microphotographié en République Fédérale d'Allemagne.

